

A study of some anatomical characters of North American Gramineæ. V.

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WITH PLATE XXVI.

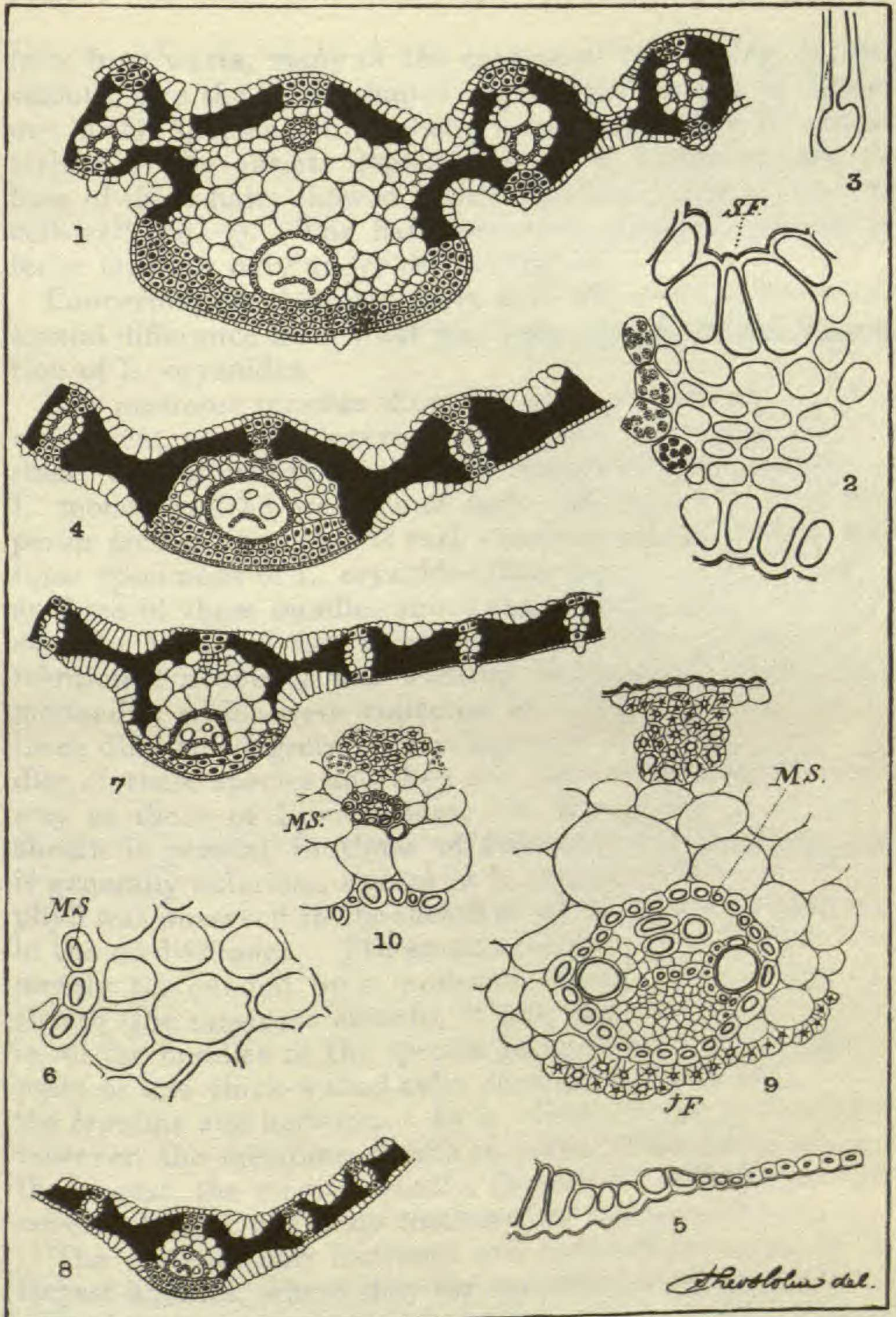
The genus *Leersia*.

In a previously published paper¹ we have described the leaf-structure of *Leersia oryzoides*, and we will now consider the other species of this genus, *L. lenticularis* Michx., *L. Virginica* Willd., *L. monandra* Swtz., and *L. hexandra* Swtz.

The anatomical structure of the leaf appears to be very uniform in this genus, and transverse sections of the midrib and the surrounding tissues show very few differences from what we have already mentioned for *L. oryzoides*. This uniformity in structure is undoubtedly due to the fact that the species in question inhabit the same kind of localities, viz., borders of lakes, ponds, or swamps. *Leersia hexandra*, however, very often grows in deep water, and therefore this species shows a greater development of the bulliform cells and the colorless parenchyma than any of the other species.

The structure of the epidermis in regard to shape and size of the single cells is very nearly the same for all our species, and agrees in most respects with that of *L. oryzoides*. In *L. lenticularis*, however, the cells of epidermis underneath the mestome bundles are very thick-walled, and remind one of stereome, when examined in transverse section (fig. 5). The bulliform cells, also, are well developed in these species and show the same arrangement as described for *L. oryzoides*, with the exception that *L. hexandra* (fig. 1), possesses groups of these cells between all the mestome bundles and on both faces of the blade; the other species have only two groups on the inferior face, there being one on each side of the midrib, while the superior face shows one group between each mestome bundle (figs. 4, 7 and 8). Epidermal expansions, warts and thorns, are present in large numbers in *L. Virginica*, *L. lenticularis* and *L. monandra*, on both faces of the leaf, as we have seen in *L. oryzoides*. *L. hexandra* is much

¹BOT. GAZETTE 17: 358. 1892.



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freer from warts, many of the epidermal cells being entirely smooth, and the thorn-shaped expansions are not so numerous in this species. Long hairs were observed to be characteristic of the variety *depauperata* of *L. hexandra*, and the base of these hairs showed a distinct constriction of the inner cell-wall (fig. 3). The hairs occurred especially on the inferior face but only under the mesophyll.

Concerning the stomata there does not seem to be any essential difference from what has been stated in our description of *L. oryzoides*.

The mestome bundles show the same development and arrangement as in *L. oryzoides*, with the exception that the small ventral bundle above the midrib is often wanting in *L. monandra*; the presence of such small bundles on the superior face of the blade is very characteristic of *Leersia*, and some specimens of *L. oryzoides* show the presence of as many as three of these bundles above the midrib. The species we describe here did not show more than one bundle, and, as mentioned above, it was wanting in some specimens of *L. monandra*, which were collected in Texas. There are also three different degrees of development in the mestome bundles of these species and they are characterized in the same way as those of *L. oryzoides*. A thin-walled parenchyma sheath is present in those of first and second degree, and is generally colorless, except in *L. lenticularis*, where chlorophyll was observed in the sheath of all the bundles, though not in the median ones. The small ventral mestome bundles are merely surrounded by a mestome sheath. Concerning this sheath (the mestome sheath), it was observed to be present in all the bundles of the species in question, and consists of more or less thick-walled cells, forming a closed ring around the leptome and hadrome. In *L. Virginica* and *L. hexandra*, however, the mestome sheath is rather thin-walled, even in the largest, the median bundle; the variety *depauperata* had, nevertheless, a distinctly thick-walled mestome sheath.

The leptome and hadrome are well differentiated in the largest bundles, where they are separated from each other by a single or sometimes double layer of thick-walled mestome parenchyma, as in *L. lenticularis*. The smaller mestome bundles, those of second degree, have the hadrome part less developed, and have no layer of thick-walled mestome parenchyma. The ventral bundle is still more reduced and con-

tains only leptome in *L. monandra*, *hexandra* and *lenticularis*. By comparing the development of the mestome bundles of all our species of *Leersia* it is readily seen that those of *L. hexandra* (fig. 1), are the strongest, and that they form prominent ribs in connection with the heavy layers of stereome. This species, *L. hexandra*, possesses also larger groups of stereome than any of the other species in question. In regard to the arrangement of the stereome, however, there does not seem to be any difference between the various species of *Leersia*.

The mesophyll shows very near the same development and arrangement as we have seen in *L. oryzoides*. *L. hexandra* is an exception, however, and the section (fig. 1), shows that this tissue is separated in groups by the large colorless parenchyma.

The colorless parenchyma has therefore its greatest development in *L. hexandra*, where it is especially observable in the middle of the blade, besides this smaller groups of similar, but somewhat thickened, cells connect the bulliform cells of the dorsal and ventral face of the blade in this same species. The other species of *Leersia* agree with *L. oryzoides* in regard to development and arrangement of this form of parenchyma.

By considering now the leaf-structure of the genus *Leersia* the following characters may serve for the discrimination of the species:

Epidermis.

Hairs on the inferior face outside the mesophyll	{	<i>L. oryzoides.</i>
		<i>L. hexandra</i> , var.
		<i>depauperata.</i>
Bulliform cells forming groups between all the mestome-bundles on both faces		<i>L. hexandra.</i>
Epidermal-cells of the inferior face outside the mestome-bundles very thick-walled with narrow lumen		<i>L. lenticularis.</i>
Epidermal-cells very warty	{	<i>L. oryzoides.</i>
		<i>L. Virginica.</i>
		<i>L. monandra.</i>
Epidermal-cells often perfectly smooth	{	<i>L. lenticularis.</i>
		<i>L. hexandra.</i>

Mestome-bundles.

From one to three small bundles above the midrib	{	<i>L. oryzoides.</i>
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